Fee Transmittal Form

Amendment / Reply

After Final

Extension of Time Request

Certified Copy of Priority

Response to Missing Parts/ Incomplete Application

Document(s)

Firm

Individual name

Signature

Date

Express Abandonment Request

Information Disclosure Statement

Response to Missing Parts under 37 CFR 1.52 or 1.53

Affidavits/declaration(s)

Fee Attached

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TRANSMITTAL **FORM**

(to be used for all correspondence after initial filing)

Application Number	10/646,246
Filing Date	08/22/2003
First Named Inventor	S. S. P. Parkin
Group Art Unit	1762
Examiner Name	to be assigned
Attorney Docket Number	APC020030057US1

Total Number of Pages in This Submission

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m	Assignment Papers (for an Application)	After Allowance Communication to Group
ı	Drawing(s)	Appeal Communication to Board of Appeals and Interferences
claration(s)	Licensing-related Papers Petition Petition to Convert to a Provisional Application Power of Attorney, Revocati Change of Correspondence	Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) Proprietary Information Status Letter Other Enclosure(s) (please
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Daniel E. John	son	

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Typed or printed name	Cheryl G. Ruby				
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04/14/2004

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TOTAL AMOUNT OF PAYMENT

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Co	omplete if Known	•
Application Number	10/646,246	
Filing Date	08/22/2003	
First Named Inventor	S. S. P. Parkin	_
Examiner Name	to be assigned	_
Group Art Unit	1762	_
Attorney Docket No.	ARC920030057US1	_

METHOD OF PAYMENT	FEE CALCULATION (continued)				
1. The Commissioner is hereby authorized to charge indicated focal and exadit any authorized to charge	3. ADDITIONAL FEES				
Deposit Deposit	Large Small				
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Account Name IBM CORPORATION	105 130 205 65 Surcharge - late filing fee or oath				
Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17	127 50 227 25 Surcharge - late provisional filing fee or cover sheet				
Applicant claims small entity status.	139 130 139 130 Non-English specification				
See 37 CFR 1.27 2. Payment Enclosed:	147 2,520 147 2,520 For filing a request for ex parte reexamination				
2. Payment Enclosed: Check Credit card Money Order Other	112 920* 112 920* Requesting publication of SIR prior to Examiner action				
FEE CALCULATION	113 1,840* 113 1,840* Requesting publication of SIR after Examiner action				
1. BASIC FILING FEE	115 110 215 55 Extension for reply within first month				
Large Entity Small Entity	116 400 216 200 Extension for reply within second month				
Fee Fee Fee Fee Description Code (\$) Code (\$) Fee Paid	117 920 217 460 Extension for reply within third month				
101 740 201 370 Utility filing fee	118 1,440 218 720 Extension for reply within fourth month				
106 330 206 165 Design filing fee	128 1,960 228 980 Extension for reply within fifth month				
107 510 207 255 Plant filling fee	119 320 219 160 Notice of Appeal				
108 740 208 370 Reissue filing fee	120 320 220 160 Filing a brief in support of an appeal				
114 160 214 80 Provisional filing fee	121 280 221 140 Request for oral hearing				
SUPTOTAL (1) (1) 0 00	138 1,510 138 1,510 Petition to institute a public use proceeding				
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2. EXTRA CLAIM FEES Fee from	141 1,280 241 640 Petition to revive - unintentional	~			
Extra Claims below Fee Paid	142 1,280 242 640 Utility issue fee (or reissue)				
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Claims X 84.00 = 0.00	144 620 244 310 Plant issue fee				
Multiple Dependent	122 130 122 130 Petitions to the Commissioner				
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Code (\$) Code (\$) 103 18 203 9 Claims in excess of 20	581 40 581 40 Recording each patent assignment per property (times number of properties)				
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SUBMITTED BY				Complete (if applicable)		
Name (Print/Type)	Daniek E. Johnson		Registration No. (Attorney/Agent) 37,033	Telephone	408-927-3367	
Signature	Hamil &	ropurdal			04/14/2004	

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : April 14, 2004

S Parkin : Group Art Unit: 1762

Serial No.: 10/646,246 : Examiner: Unknown

Filed: August 22, 2003 : San Jose, California

Title: MgO tunnel barriers and method of formation

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents U.S. Patent and Trademark Office P. O. Box 1450 Alexandria, VA 22313-1450

Dear Sir:

Under the provisions of 37 CFR § 1.97 through §1.99 and pursuant to Applicant's duty of disclosure under 37 CFR §1.56, Applicant respectfully brings the following document(s) listed on the attached form PTO-1449 to the attention of the Examiner in charge of the above-identified application. Copies of the listed document(s) are provided herewith.

This Information Disclosure Statement is being submitted before receiving a first Office Action on the merits for the above-identified patent application. (No fee is due.)

This submission does not constitute an admission that the cited reference(s) are relevant or material to the claims. The reference(s) are only cited as constituting related art of which Applicant is aware.

It is respectfully requested that the listed references be considered by the Examiner and formally made of record in this application.

The Director is hereby authorized to charge payment of any deficiency in the above fee(s) or to charge any additional fees required under 37 CFR § 1.16 or 1.17 or credit any overpayment to Deposit Account No. 09-0441. A duplicate copy of this authorization is attached for the Finance Branch.

Respectfully submitted,

S. Parkin

Daniel E. Johnson (#37,03)

Agent for Applicant Phone (408) 927-3367

DEJ:cgr

Attachments

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Sheet 1 of 5

Complete if Known				
Application Number	10/646,246			
Filing Date	August 22, 2003			
First Named Inventor	S. Parkin			
Art Unit	1762			
Examiner Name	Unassigned			
Attorney Docket Number	ARC920030057US1			

		U.S. PATI	ENT DOCUMENTS	
Examiner Initials	 Document Number Number - Kind Code ² (if known	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US- 5,390,061	02-14-1995	Nakatani et al.	
	US- 5,465,185	11-07-1995	Heim et al.	
	US- 5,640,343	06-17-1997	Gallagher et al.	
	US- 5,650,958	07-22-1997	Gallagher et al.	
	US- 5,729,410	03-17-1998	Fontana Jr. et al.	
	US- 5,764,567	06-09-1998	Parkin	
	US- 5,841,692	11-24-1998	Gallagher et al.	
	US- 5,936,293	08-10-1999	Parkin	
	US- 6,153,320	11-28-2000	Parkin	
	US- 6,226,160	05-01-2001	Gallagher et al.	
	US- 6,347,049	02-12-2002	Childress et al.	
	US- 6,359,289	03-19-2002	Parkin	
	US- 6,388,268	05-14-2002	Kim et al.	
	US- 6,392,281	05-21-2002	Tsuge	
	US- 6,429,497	08-06-2002	Nickel	
	US- 6,535,365	03-18-2003	Lukaszew et al.	
	US- 2002/0076940 A1	06-20-2002	Hibino	
	US- 2002/0097534 A1	07-25-2002	Sun et al.	
	US- 2002/0097535 A1	07-25-2002	Ito et al.	
	US- 2002/0097537 A1	07-25-2002	Shimazawa	

	FOREIGN PATENT DOCUMENTS							
Examiner Initials	Cite No.1	Foreign Patent Document Country, Code 3 - Number 4 - Kind Code 5 (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Т6		

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		_		Application Number	10/646,246		
INFORMATION DISCLOSURE				Filing Date	August 22, 2003		
STATEMENT BY APPLICANT			APPLICANT	First Named Inventor	S. Parkin		
				Art Unit	1762		
(use as many sheets as necessary)			s necessary)	Examiner Name	Unassigned		
Sheet	2	of	5	Attorney Docket Number	ARC920030057US1		

			U.S. PATI	ENT DOCUMENTS	
Examiner Initials		Document Number Number - Kind Code ² (if known	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 2002/0114112 A1	08-22-2002	Nakashio et al.	
		us- 2002/0159203 A1	10-31-2002	Saito et al.	
		US- 2002-0163764 A1	11-07-2002	Nakazawa et al.	
		US- 2002/0164828 A1	11-07-2002	Ishiwata et al.	
		us- 2002/0191355 A1	12-19-2002	Hiramoto et al.	
		US- 2003/0035249 A1	02-20-2003	Ho et al.	
		US- 2003/0058685 A1	03-27-2003	Tran et al.	
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Examiner Initials	Cite No. 1	Foreign Patent Document Country Code3 -Number4 - Kind Code5 (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Т6	
		JP 2000 322714	24-Nov-2000	Teruaki et al.	Abstract		
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Examiner	Date
Signature	Considered

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Complete if Known				
Application Number	10/646,246			
Filing Date	August 22, 2003			
First Named Inventor	S. Parkin			
Group Art Unit	1762			
Examiner Name	Unassigned			
Attorney Docket Number	ARC920030057US1			

Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	Т
		M. Julliere, "Tunneling Between Ferromagnetic Films", Physics Letters, Vol. 54A, Number 3, September 8, 1975, pp. 225-226.	
		R. Meservey et al., "Spin-Polarized Electron Tunneling", Physics Reports (Review Section of Physics Letters) Vol. 238, No. 4, 1994, pp. 173-243.	
		J. S. Moodera et al., "Large Magnetoresistance at Room Temperature in Ferromagnetic Thin Film Tunnel Junctions", Physical Review Letters, Vol. 74, No. 16, April 17, 1995, pp. 3273-3276.	
		T. Miyazaki et al., "Giant magnetic tunneling effect in Fe/A12O3/Fe junction", Journal of Magnetism and Magnetic Materials , Vol. 139, 1995, pp. L231-L234.	
		D. J. Keavney et al., "Perpendicular conductance and magnetic coupling in epitaxial Fe/MgO/Fe(100) trilayers", J. Appl. Phys., Vol. 81, No. 2, January 15, 1997, pp. 795-798.	
		P. K. Wong et al., "High conductance magnetoresistive tunnel junctions with multiply oxidized barrier", Journal of Applied Physics, Vol. 83, No. 11, June 1, 1998, pp. 6697-6699.	
		E. Y. Tsymbal et al., "Spin-polarized electron tunneling across a disordered insulator", Physical Review B, Vol. 58, No. 1, July 1, 1998-I, pp. 432-437.	
		S.S.P. Parkin et al., "Exchange-biased magnetic tunnel junctions and application to nonvolatile magnetic random access memory (invited)", J. of Applied Physics, Vol. 85, _No8April_151999,_pp5828-5833	
		K. Aoshima et al., "Thermal deterioration mechanism of CoFeB/PdPtMn Spin valves", J. of Applied Physics, Vol. 85, No. 8, April 15, 1999, pp. 5042-5044.	
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		D. J. Monsma et al., "Spin polarization of tunneling current from ferromagnet/A12O3 Interfaces using copper-doped aluminum superconducting films", Applied Physics Letters, Vol. 77, No. 5, July 31, 2000, pp. 720-722.	

Examiner	Date	
Signature	Considered	

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FIGURE TRADE

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Attorney Docket Number	ARC920030057US1			

Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	Т
		XF. Han et al., "Fabrication of high-magnetoresistance tunnel junctions using Co75Fe25 ferromagnetic electrodes", Applied Physics Letters, Vol. 77, No. 2, July 10, 2000, pp 283-285.	
		H. Xi, "Annealing Effect on Exchange Bias in Ni81Fe19/Cr50Mn50 Bilayers", IEEE Transactions on Magnetics, Vol. 36, No. 5, September 2000, pp. 2644-2646.	
		S. Cardoso et al., "High thermal stability tunnel junctions", Journal of Applied Physics, Vol. 87, No. 9, May 1, 2000, pp. 6058-6060.	
		S. Cardoso et al., "Spin-tunnel-junction thermal stability and interface interdiffusion above 300 C", Applied Physics Letters, Vol. 76, No. 5, January 31, 2000, pp. 610-612.	
		M. Takiguchi et al., "Thermal degradation of spin valve multilayers caused by Mn Migration", Journal of Applied Physics, Vol. 87, No. 5, March 1, 2000, pp. 2469-2471.	
		H.L. Meyerheim et al., "Geometrical and Compositional Structure at Metal-Oxide Interfaces: MgO on Fe(001)", Physical Review Letters, Vol. 87, No. 7, August 13, 2001, pp. 076102-1 through 076102-4.	
		M. Bowen et al., "Large magnetoresistance in Fe/MgO/FeCo(001) epitaxial tunnel junctions on GaAs(001)", Applied Physics Letters, Vol. 79, No. 11, Sept. 10, 2001, pp. 1655-1657.	
		W. Wulfhekel et al., "Single-crystal magnetotunnel junctions", Applied Physics Letters, Vol. 78, No. 4, Jan. 22, 2001, pp. 509-511.	
		W. H. Butler et al., "Spin-dpendent tunneling conductance of Fe/MgO/Fe sandwiches", Physical Review B, Vol. 63, Jan. 8, 2001, pp. 054416-1 through 054416-12.	
		Y. Kim et al., "Magnetoresistance and interlayer diffusion in PtMn spin valves upon postdeposition annealing", J. of Applied Physics, Vol. 89, No. 11, June 1, 2001, pp. 6907-6909.	
		S. Yuasa et al., "Spin-Polarized Resonant Tunneling in Magnetic Tunnel Junctions", Science, Vol. 297, July 12, 2002, pp. 234-237.	

	Examiner	Dat	te
Į	Signature	Cor	nsidered



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Examiner Initials	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.]
		E. Popova et al., "Epitaxial MgO layer for low-resistance and coupling-free magnetic tunnel junctions", Applied Physics Letters, Vol. 81, No. 6, August 5, 2002, pp. 1035-1037.	
,		M. Tsunoda et al., "60% magnetoresistance at room temperature in Co-Fe/Al-O/Co-Fe tunnel junctions oxidized with Kr-O2 plasma", Appl. Phys. Letters", Vol. 80, No. 17, April 29, 2002, pp. 3135-3137.	
		XG. Zhang et al., "Effects of the iron-oxide layer in Fe-FeO-MgO-Fe tunneling junctions", Physical Review B, Vol. 68, 2003, pp. 092402-1 through 092402-4.	
		S. Mitani et al., "Fe/MgO/FeCo(100) epitaxial magnetic tunneljunctions prepared by using in situ plasma oxidation", Journal of Applied Physics, Vol. 93, No. 10, May 15, 2003, pp. 8041-8043.	
		J. Faure-Vincent et al., "High tunnel magnetoresistance in epitaxial Fe/MgO/Fe tunnel junctions", Applied Physics Letters, Vol. 82, No. 25, June 23, 2003, pp. 4507-4509.	
		M. Zwierzycki et al., "Spin injection through an Fe/InAs interface", Physical Review B, Vol. 67, 2003, pp. 092401-1 through 092401-4.	
		D. Smith et al., "Structural characterization of thin film ferromagnetic tunnel junctions", Journal of Applied Physics, Vol. 83, No. 10, May 15, 1998, pp. 5154-5158.	
		J. Mathon et al., "Theory of tunneling magnetoresistance of an epitaxial Fe/MgO/Fe (001) junction", Physical Review B, Vol. 63, pp. 220403-1 through 220403-4.	
		M. Klaua et al., "Growth, structure, electronic, and magnetic properties of MgO/Fe(001) bilayers and Fe/MgO/Fe(001) trilayers", Physical Review B, Vol. 64, pp.134411-1 through 134411-8.	
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Examiner	Date
Signature	Considered

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